

RES integration in the Belgian Balancing market

Symposium on European Grid Service Markets

Lucerne
July 6th 2017
Bob Hebb

Agenda

- Intro to Elia group
- Belgium Changing context & action plan
- Action plan
 - Improve the system imbalance
 - More efficient and more reliable determination of needs
 - XB integration
 - Diversification of resources

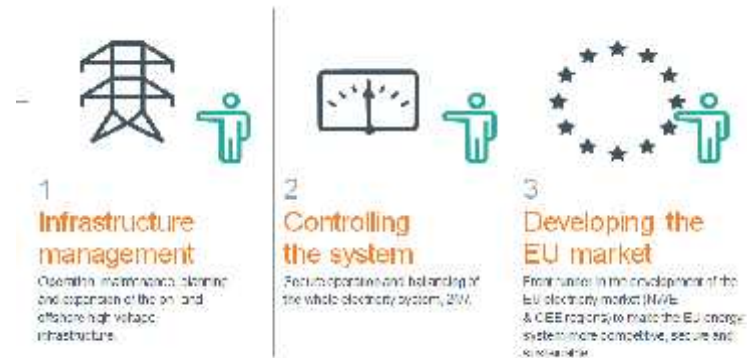
Elia Group, a unique positioning at the heart of Europe



Two TSO Companies with international activities

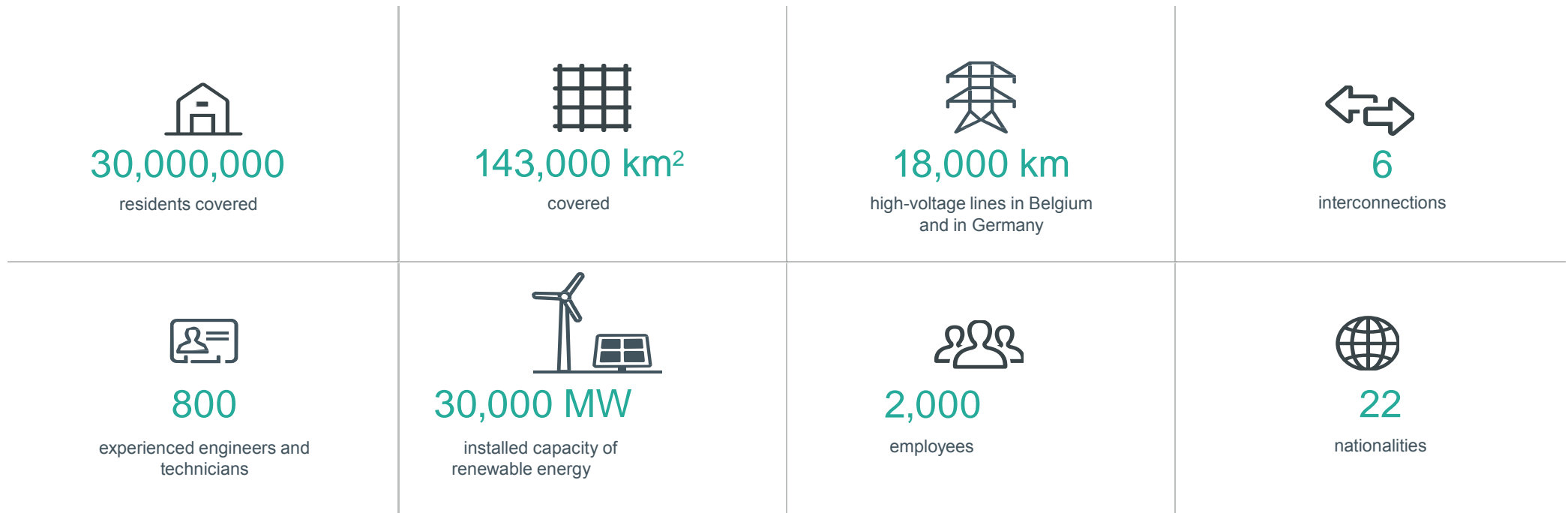


The Elia Group is expanding its international activities through Elia Grid International



Fact & Figures Elia Group

Top 5 Player in the EU TSO Business



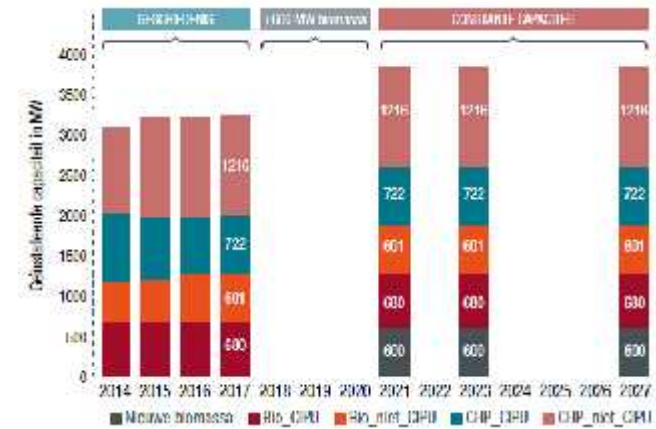
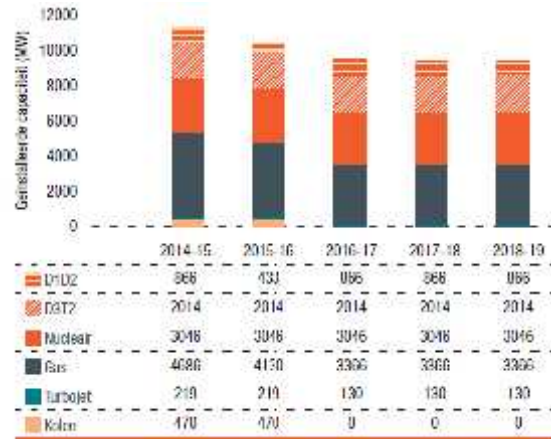
BE balancing market: Changing context & action plan

Changing Context Belgium

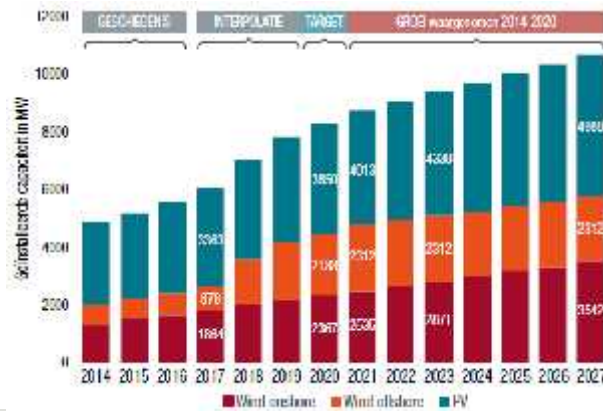
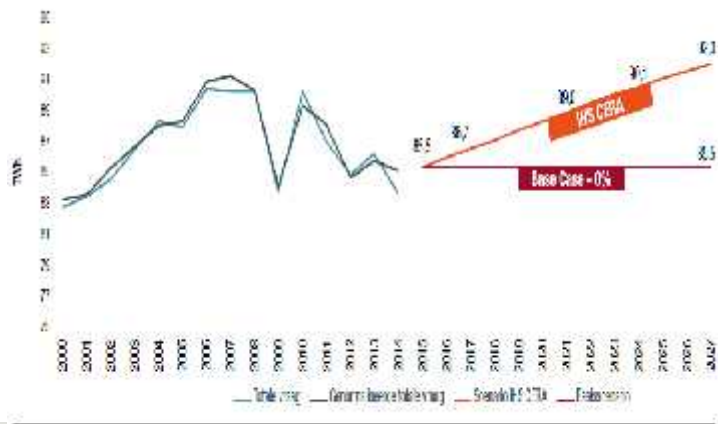
(Expected) Evolutions installed capacity



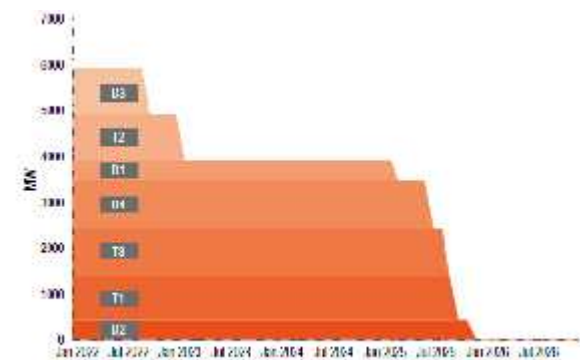
Total installed capacity classic generation



Evolution load

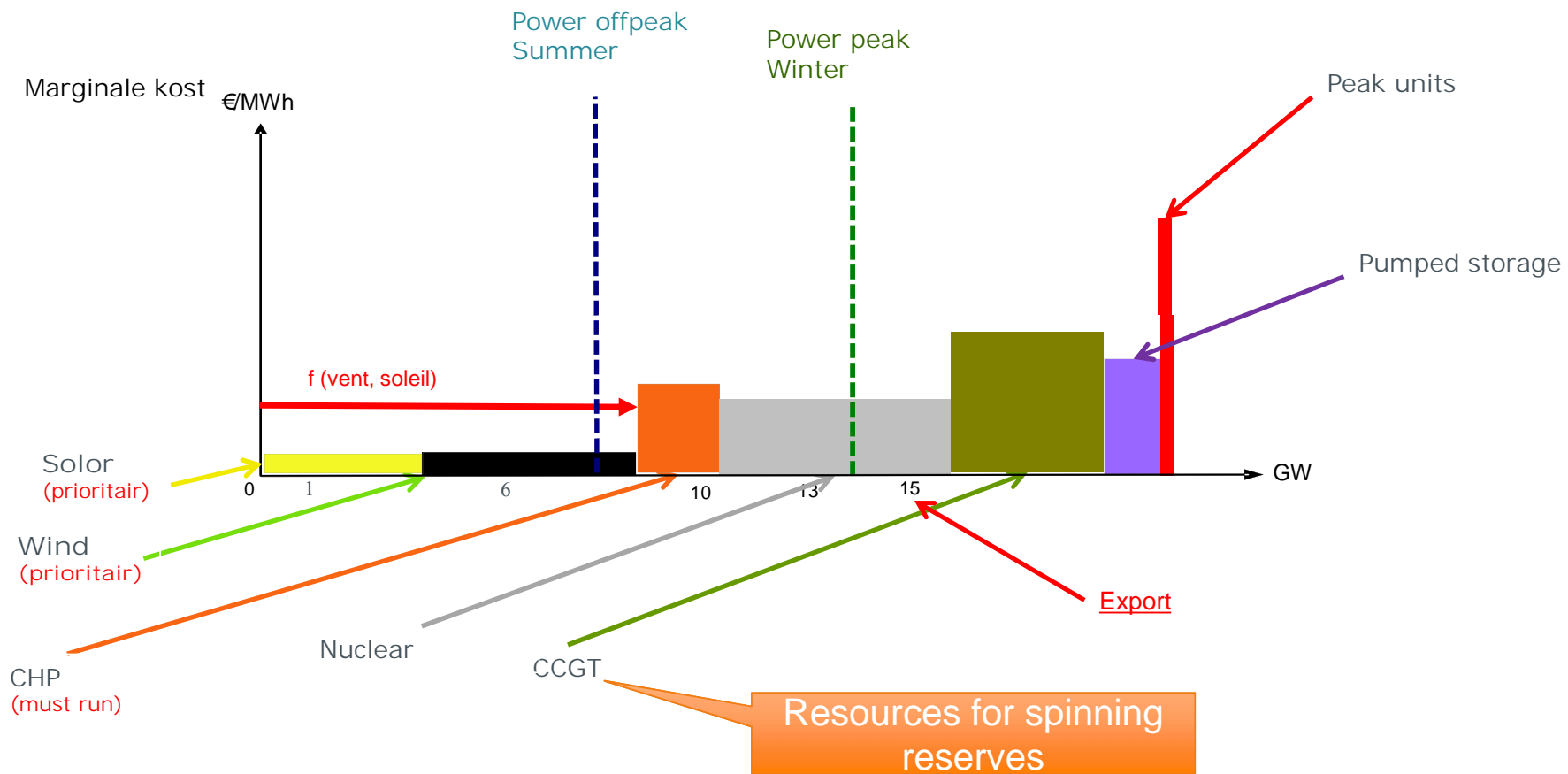


Evolution installed MW nuclear



Changing Context BE:

demand vs must runs 2020: High res



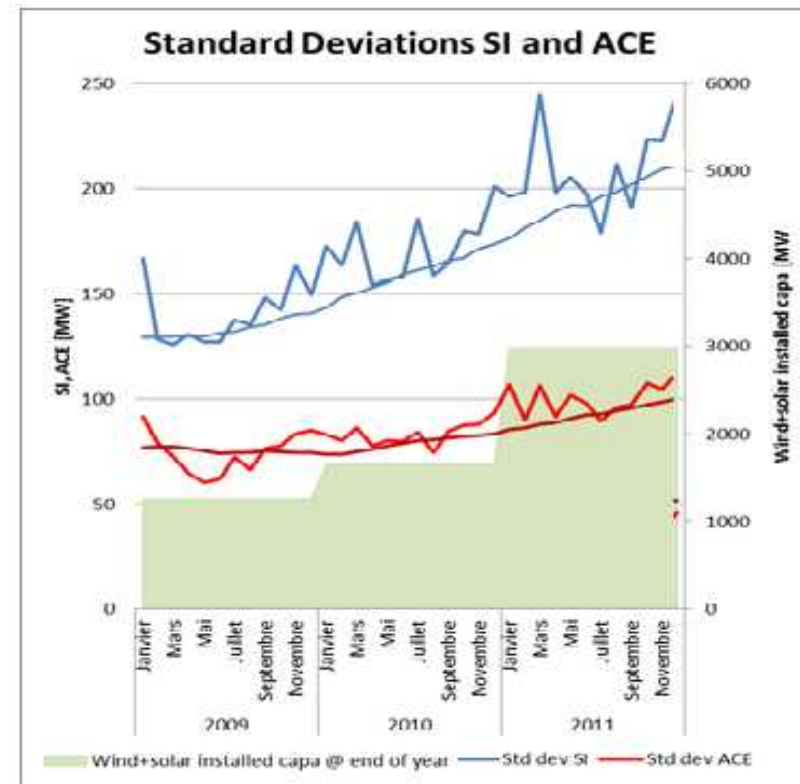
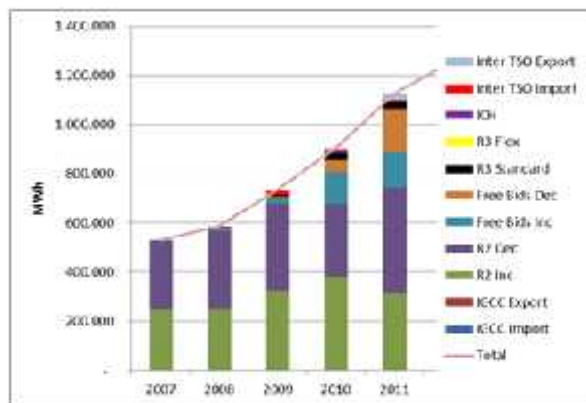
OBSERVATION 2011 System imbalance

Since 2009 tendency due RES

- increase of standard deviation of System Imbalances and ACE
- Increase of activation of balancing energy

Running hours for CCGTs are decreasing

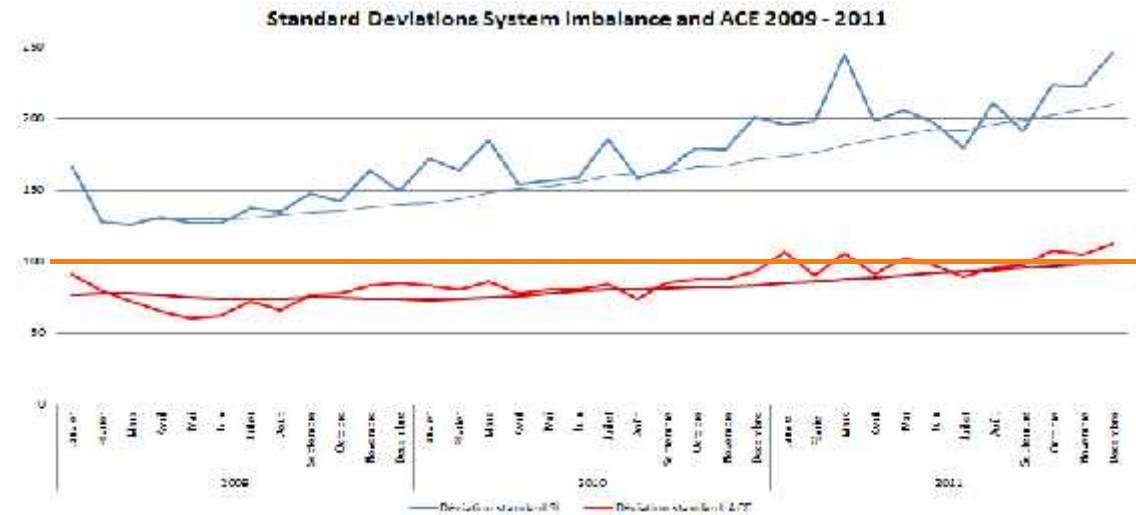
- must run costs for spinning reserves are increasing
- needs for reserves are increasing



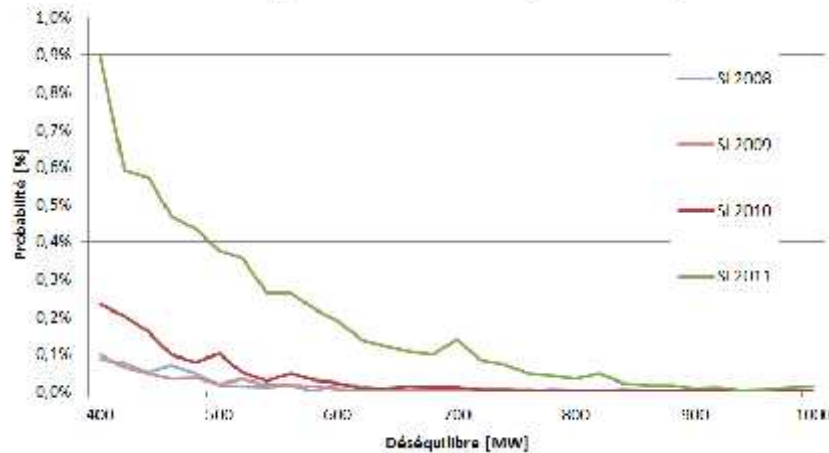
System Imbalance => impact on reserve needs

SO GL aFRR

respect quality targets ACE
Impact aFRR needs



Observed high short imbalances [2008 - 2011]



SO GL (m)FRR

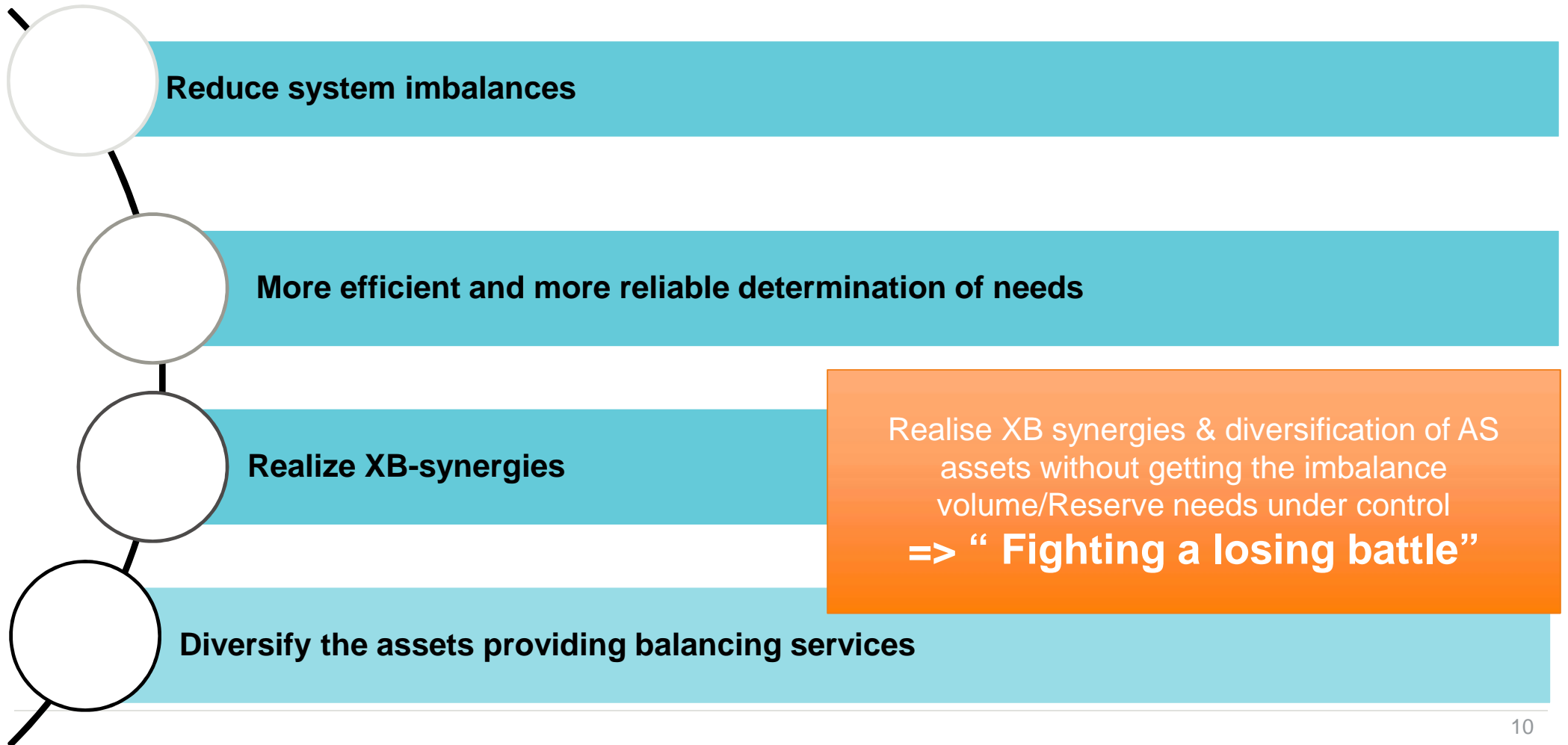
Max (Probabilistic Pdef 99,9%; N-1)

positive	SI 2008	SI 2009	SI 2010	SI 2011
99,00%	333	349	401	618
99,90%	565	532	589	856
N-1	1000	1000	1000	1000

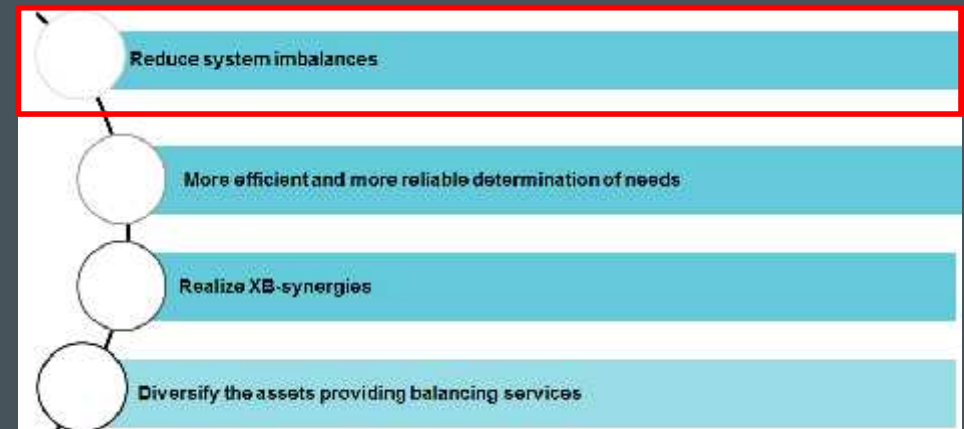
Note: Ex post ad hoc simulations

Changing Context:

Solutions for Elia = working on different axis



Reduce imbalance volumes

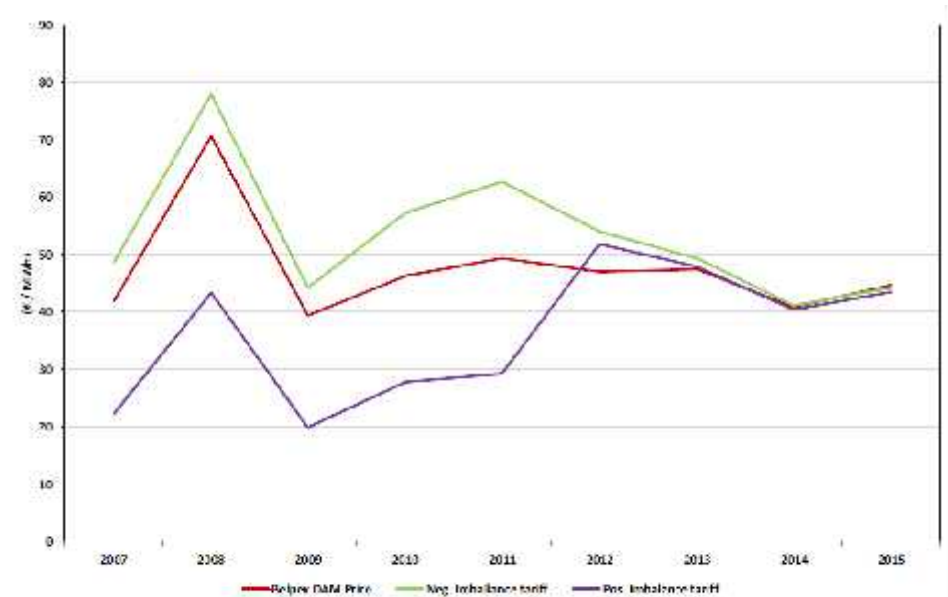
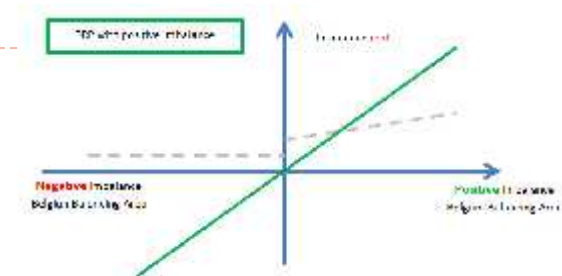
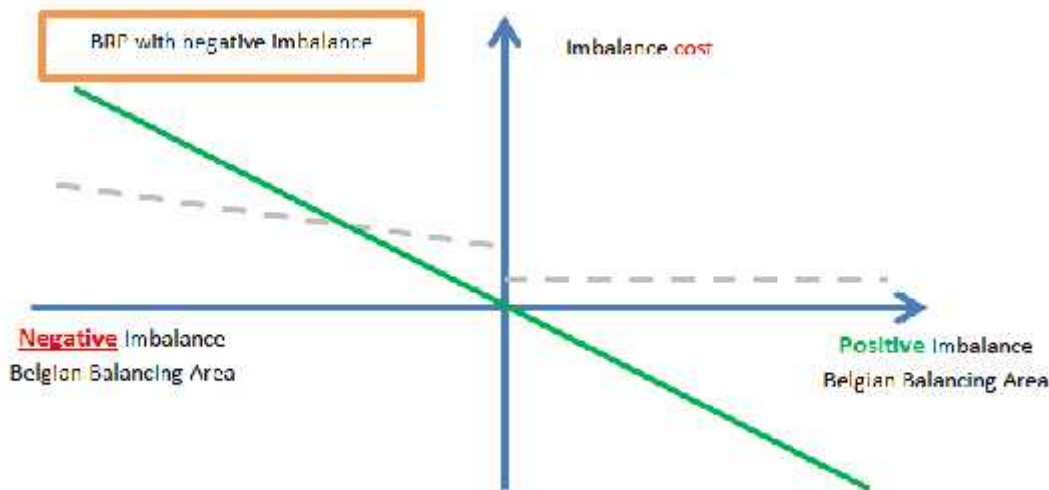


Since 2011 significant efforts for improving the system imbalance

New imbalance price structure

New imbalance prices:

- Move from double average to single marginal pricing
- Marginal : stronger incentives for large imbalances
- single; Reward imbalances helping the system at a fair price
- Single: no risk for uncertainty individual position



Figuur 84: Jaarlijkse gemiddelde oneverwichtstarieven, voor een negatief ("Neg. Imbalance Tariff") en een positief oneverwicht ("Pos. Imbalance Tariff"), voor de periode 2007-2015 in de Elia-regelzone, evenals de gemiddelde prijs op de Belpex DAM (€/MWh).

Bronnen: CREG en Elia

Since 2011 significant efforts for improving the system imbalance

Better (real time) information

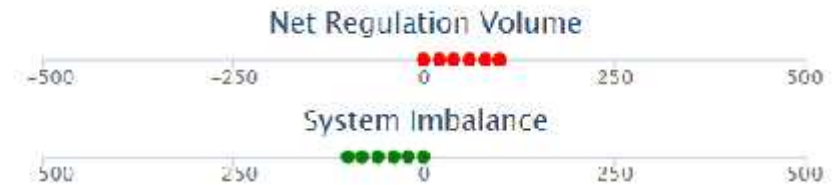
Elia is publishing real time information regarding:

- Imbalance tariffs
- Real time System state & Regulation actions
- Balancing warnings
- Available regulation capacity
- Wind & Solar forecast & metering
- Real time DSO infeed DSO infeed

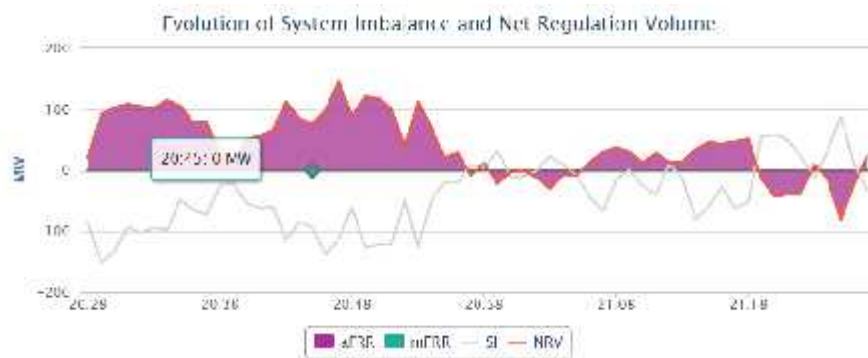
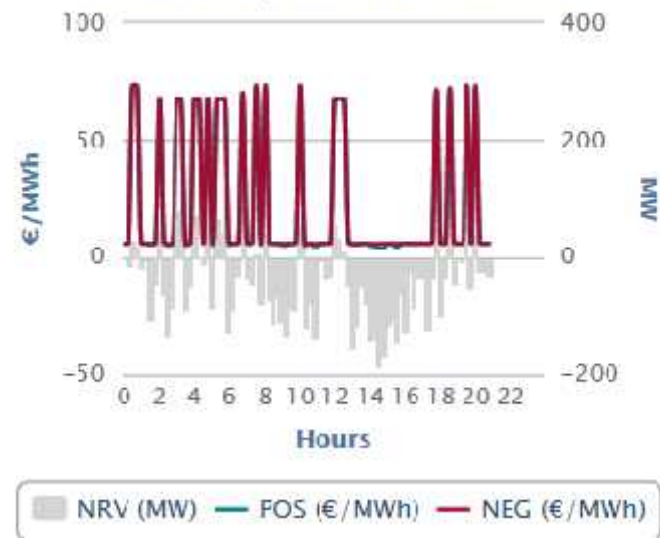
Situation at **03/07/2017 21:05**

Net Regulation Volume = 92,7 MW
Evolution of the average NRV during the current quarter hour = -54,0 MW

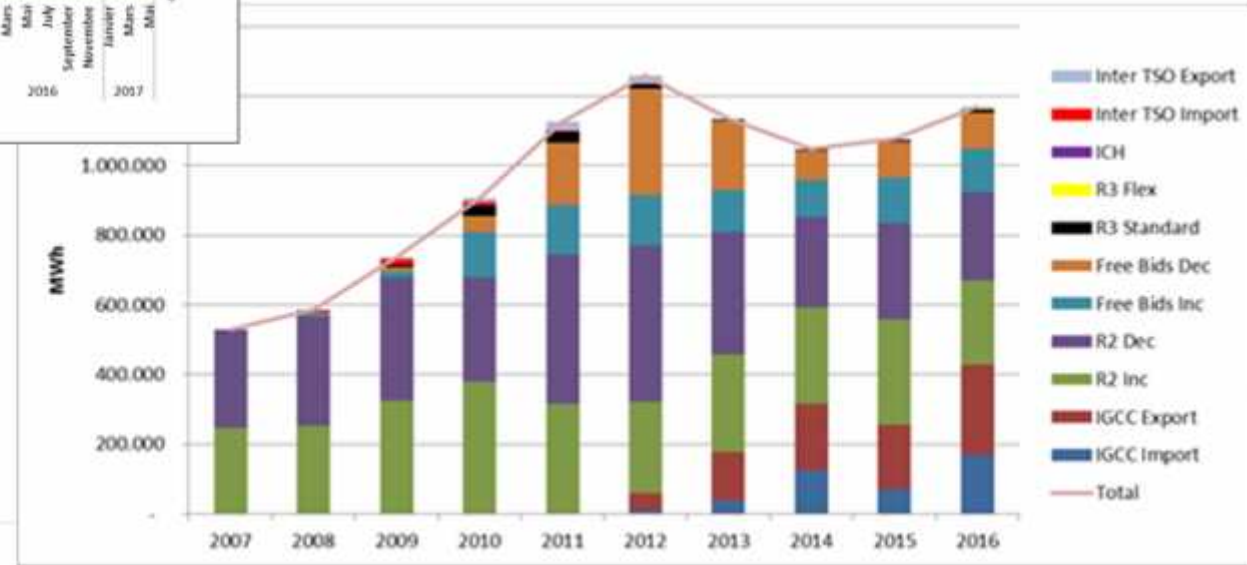
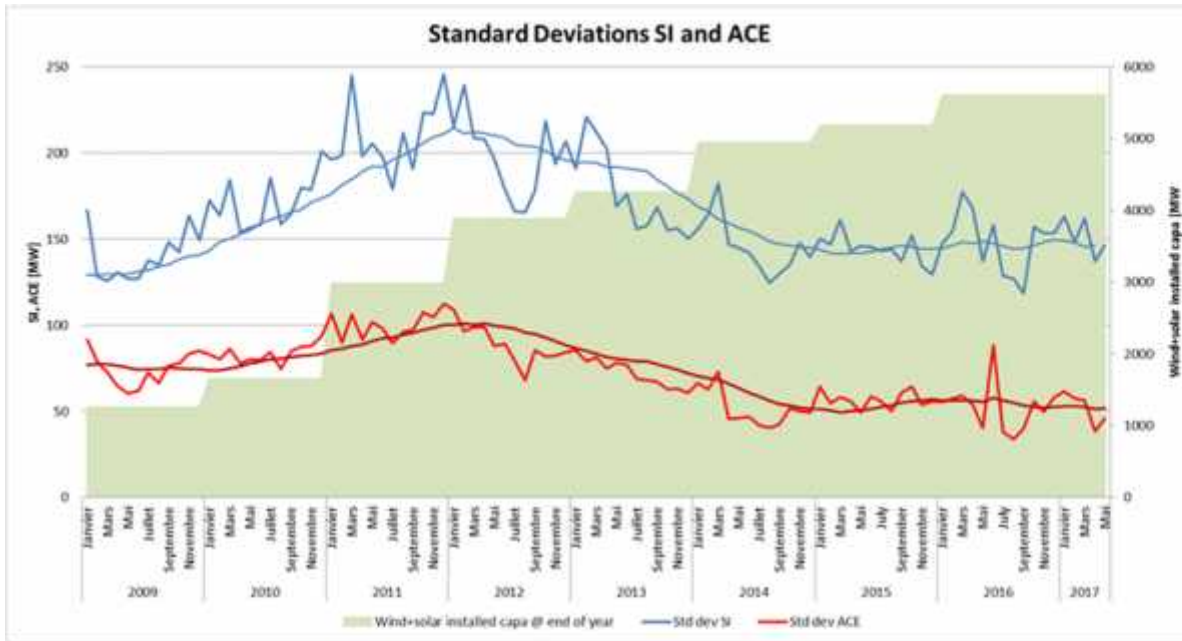
System Imbalance = 95,4 MW
Evolution of the average SI during the current quarter hour = -62,2 MW



Imbalance prices on 3-7-2017



With results.....

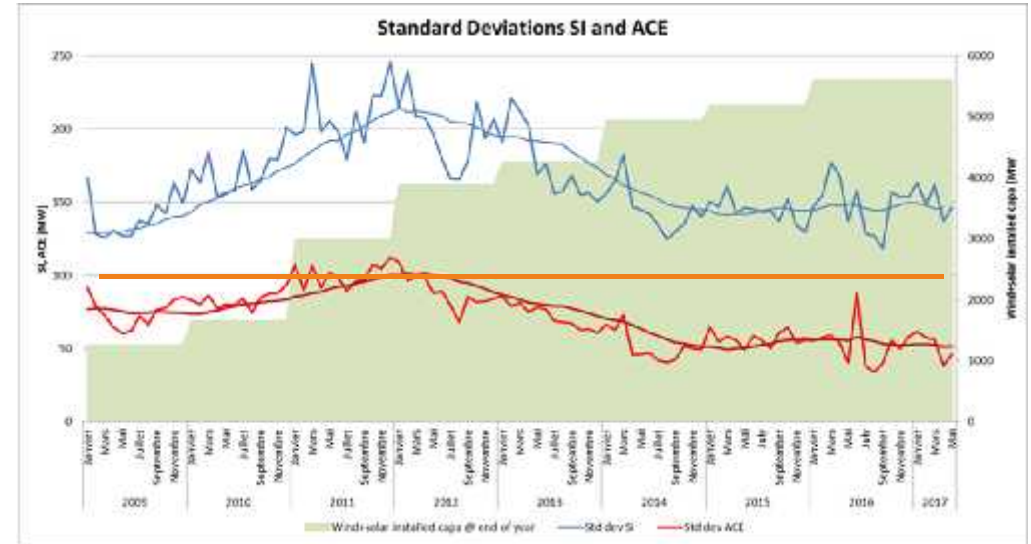
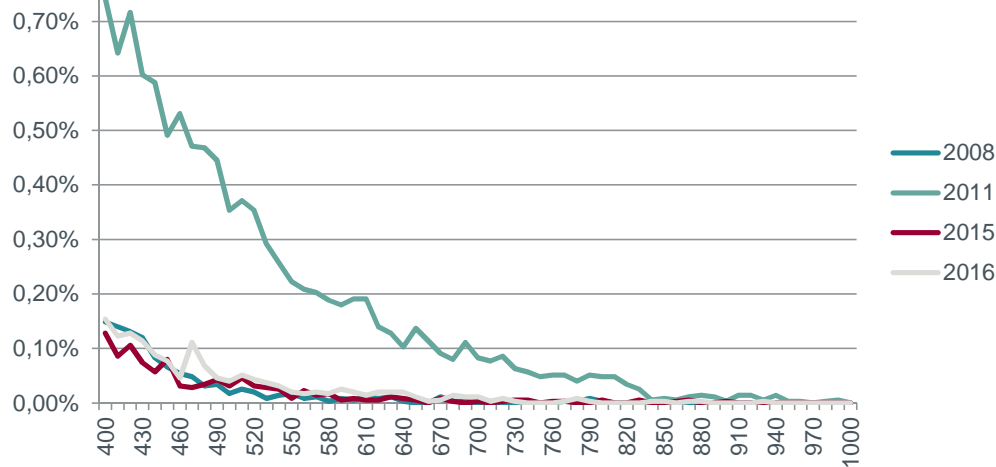


System Imbalance => impact on reserve needs

SO GL aFRR

respect quality targets ACE
Impact aFRR needs

Occurrence System Imbalances (MW)



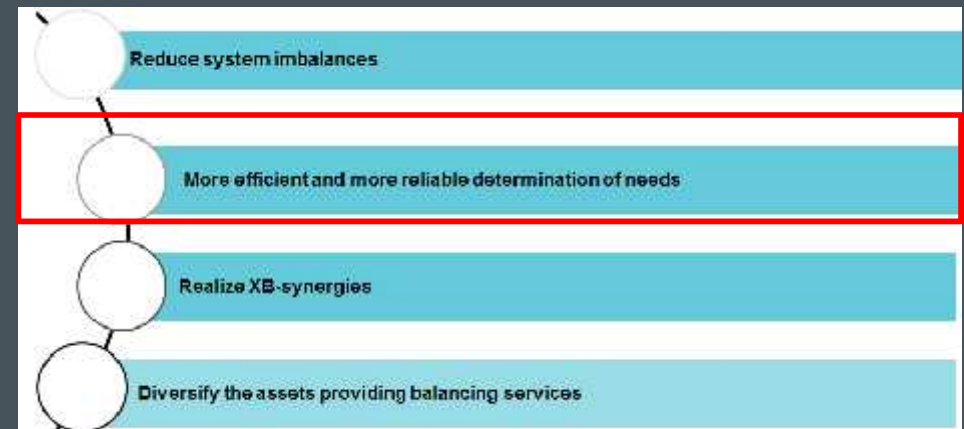
SO GL (m)FRR

Max (probalistic pdf 99,9%; N-1)

	SI 2008	SI 2011	SI 2015	SI 2016
positive	333	618	376	350
99,00%	565	856	597	570
N-1	1000	1000	1000	1000

Note: Ex post ad hoc simulations

More efficient and more reliable determination of needs



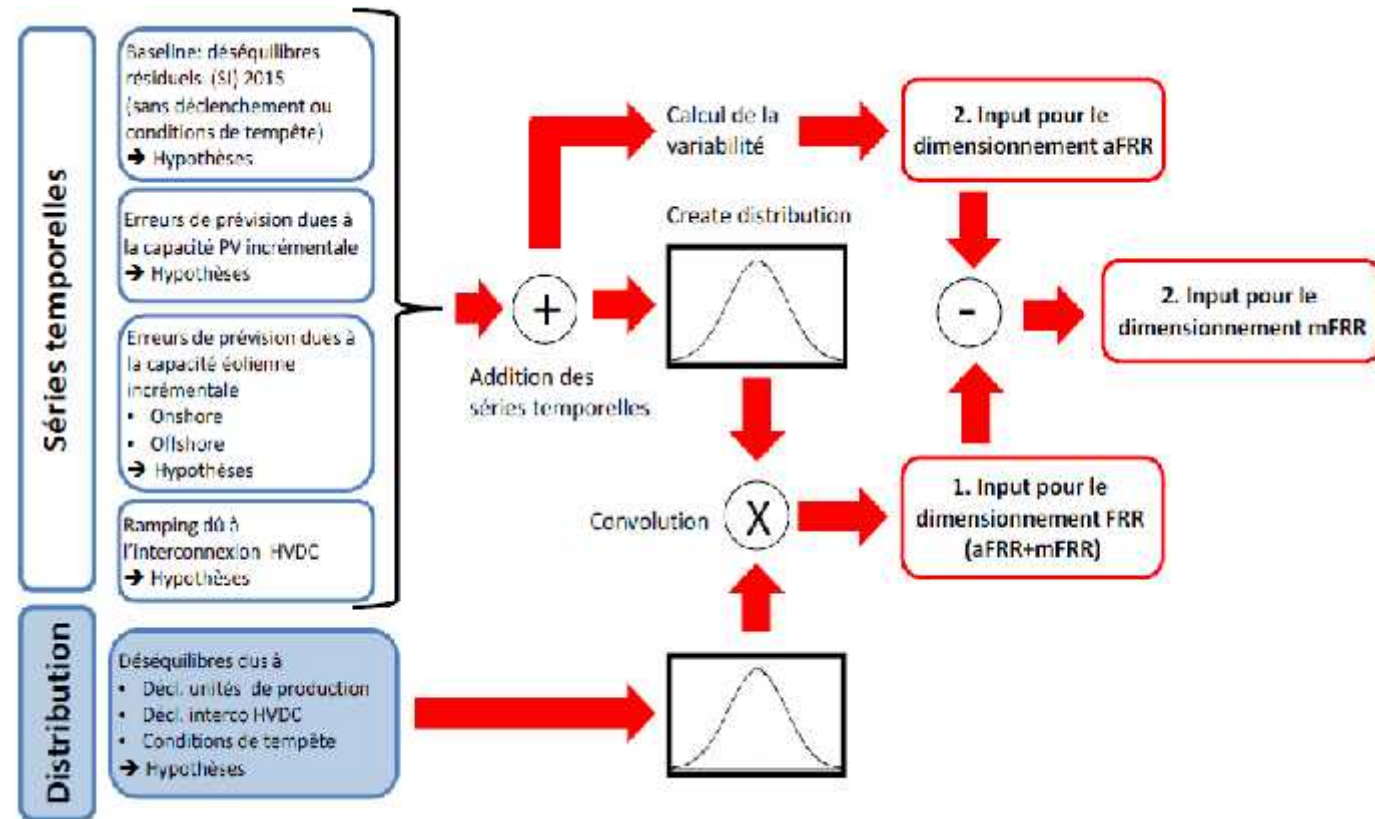
Determination of System Needs

current methodology

Currently reserve needs are calculated each year for the next year:

- Based on historical **observed system imbalances**
- Additional **forecasting errors** due to increase of renewable capacity
- **Outages** are simulated apart

Needs = Max(PDef of 0,1% ; N-1)

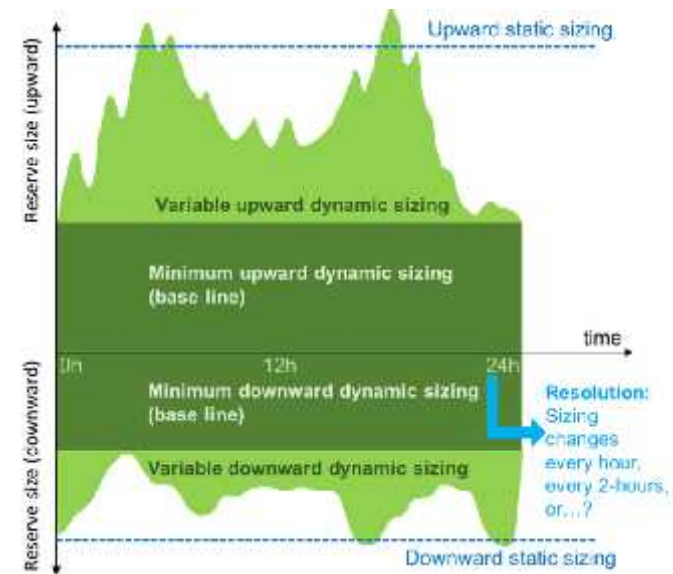


Determination of System Needs

potential future methodology

- Results AS-IS LT dimensioning needs

Horizon de temps	FRR+	aFRR+	mFRR+	FRR-	aFRR-	mFRR-
2016	910	140	770	140	140	-
Base Case						
2027	1240	175	1065	1000	175	825
2023	1240	175	1065	1000	175	825
2021	1240	175	1065	1000	175	825



- Methodology

As Is - STATIC

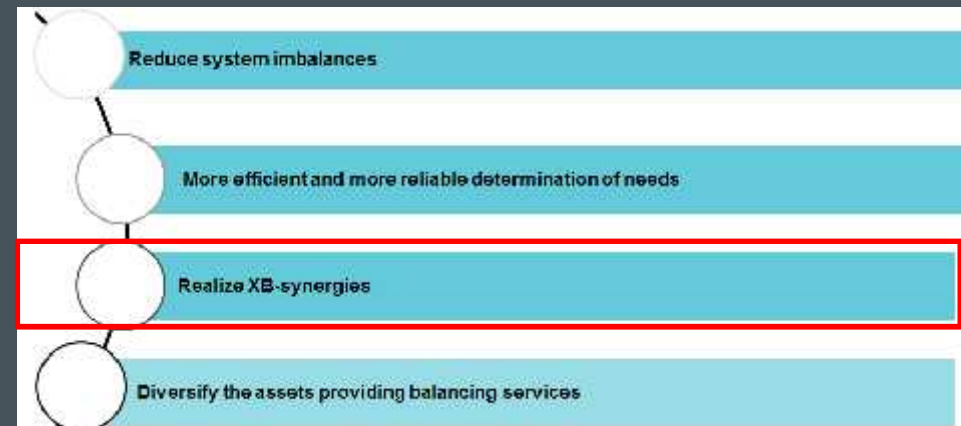
- Yearly calculation with Pdf 99,9% (99%)
 - Extreme condition can set high value for whole year (HVDC/RES)
 - Quid extreme sequential conditions for specific days in 0,1 % (1%)error



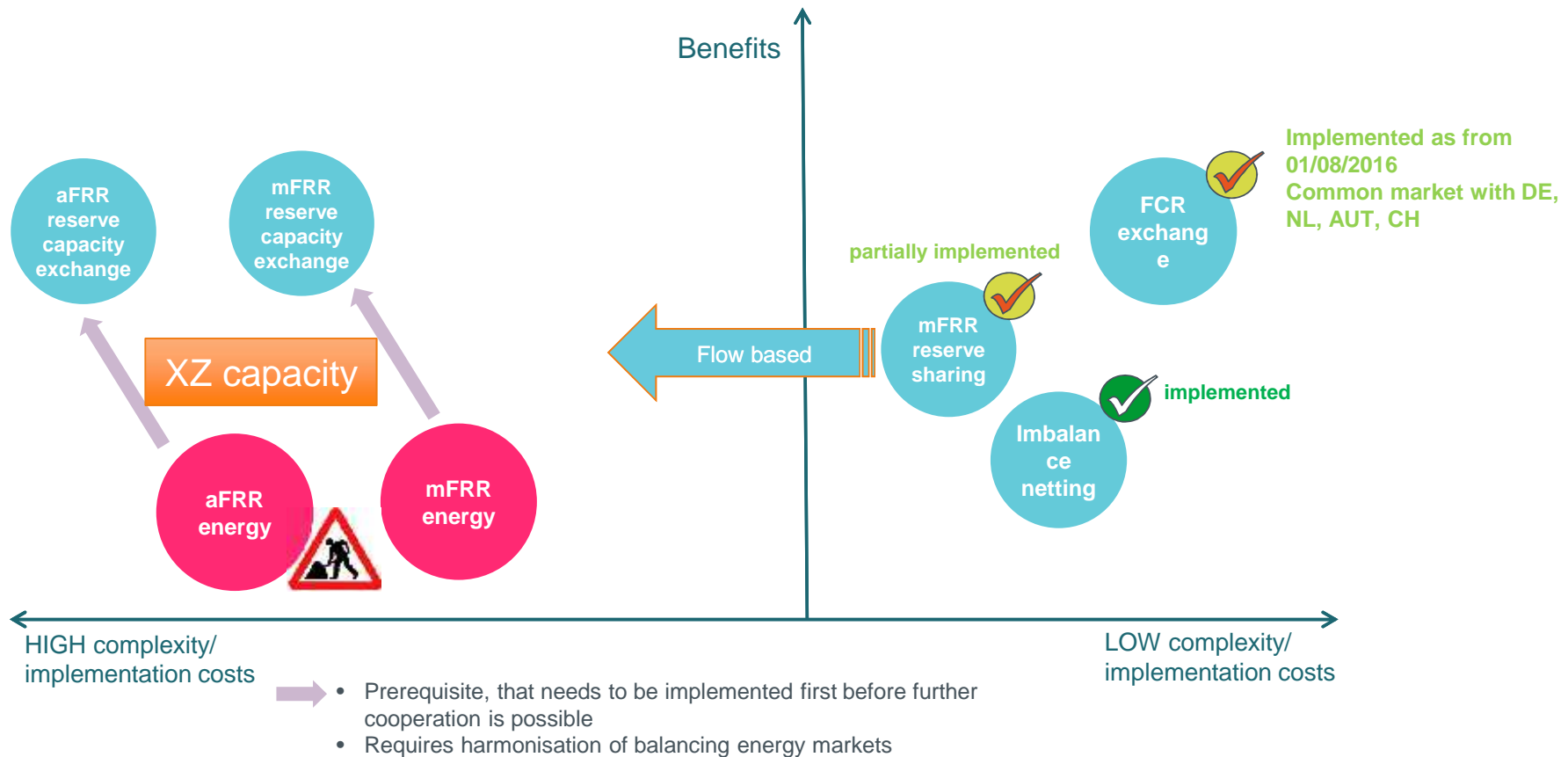
Assess potential To Be - Dynamic

- In study/development
- Needs: Dynamic daily calculation
- Results
 - Lower Rx volumes for x Days
 - Higher Rx volumes for x Days
- More reliable and more efficient

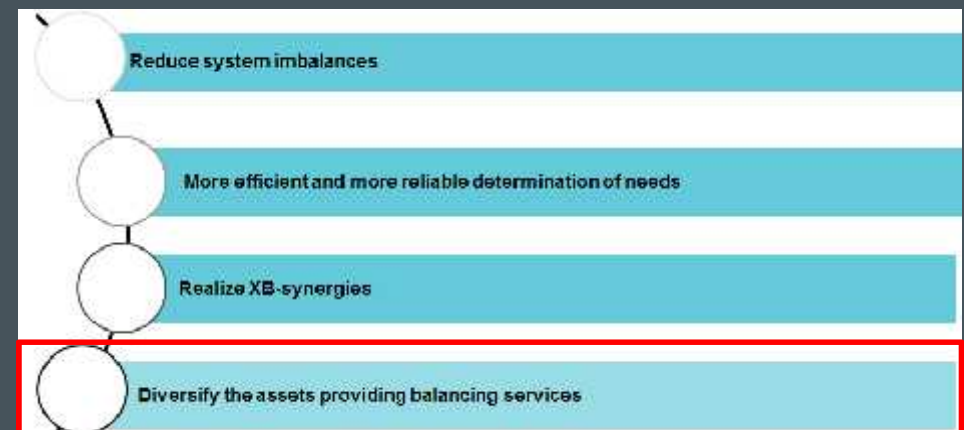
XB synergies



Overview XB balancing synergies Belgium



Diversification of assets



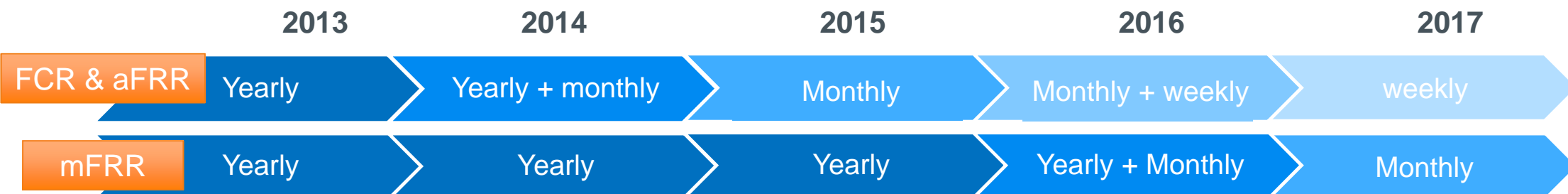
Product design balancing reserves

Enable Further Diversification

- Move to standardized technology neutral balancing products (TSO/DSO)
- Allow Portfolio bidding – aggregation of flexibility
- Allow independent aggregators
- Move to shorter term sourcing

Table 7: Impact of product duration on aFRR capacity potential

	Product duration / product resolution	Base delivery	Peak & long-off-peak	8h blocks	4h blocks
Onshore wind farm	Month	0%	0%	1%	1%
	Week	2%	4%	5%	8%
	Day	25%	34%	50%	65%
BE aggregated offshore production	Month	0%	1%	1%	1%
	Week	3%	6%	7%	11%
	Day	36%	47%	65%	78%



Current products: Contractual opening

Long Term Objectives for AS products: **Standardised technology neutral products to be provided by all types of BSPs**

Product	Product Types	TSO/DSO	technologie	Provider	Planned evolution
Frequency Containment Reserves (FCR)	R1- 200mHz	TSO & DSO	All	All incl. Independent BSPs	Generic technology neutral settlement rules as of 1/4/2017
	R1-Down R1 100mHz	TSO & DSO	All	All incl. Independent BSPs	Generic technology neutral settlement rules as of 1/4/2017
	R1-Up	TSO & DSO	All	All incl. Independent BSPs	Generic technology neutral settlement rules as of 1/4/2017
Automatic Frequency Restoration Reserves (aFRR)	R2-up	TSO only	Large powerplants	BRP-BSP	Live testing of aFRR delivered by new technology in 2017 (eg. industrial load, CHP, biomass, ...) by BRP/BSP and/or independent BSPs
	R2-down	TSO only	Large powerplants	BRP-BSP	
Manual Frequency Restoration Reserves (mFRR)	R3-standard	TSO only	Large powerplants	BRP-BSP	As of 01/01/2017 -> open for TSO/DSO -> all technologies -> all types of providers
	R3-DP	TSO & DSO	All	All incl. Independent BSPs	
	Int. Load TSO	TSO only	TSO load	Load/Aggregators	to be discontinued as of 2018
	Free bids	TSO & DSO	Large powerplants	BRP-BSP	As of 01/07/2017 open for independent BSPs on TSO grid

Many thanks for your attention!

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Barcelona, September 30th 2016